Final

Archaeological Inventory Survey Report
For City Center (Section 4) of the
Honolulu High-Capacity Transit Corridor Project,
Kalihi, Kapālama, Honolulu, and Waikīkī Ahupuaʻa,
Honolulu (Kona) District, Island of Oʻahu
TMK [1] 1-2, 1-5, 1-7, 2-1, 2-3 (Various Plats and Parcels)

Volume I

Prepared for

The City and County of Honolulu

and

The Federal Transit Administration

On Behalf of

PB Americas, Inc.

Prepared by

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Cultural Surveys Hawaiʻi, Inc.

Kailua, Hawaiʻi

(Job Code: KALIHI 23)

August 2013

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Management Summary

Reference	Archaeological Inventory Survey Report* for City Center (Section 4) of the Honolulu High-Capacity Transit Corridor Project, Kalihi, Kapālama, Honolulu, and Waikīkī Ahupua‘a, Honolulu (Kona) District, Island of O‘ahu, TMK [1] 1-2, 1-5, 1-7, 2-1, 2-3 (Various Plats and Parcels) (Hammatt 2013)
Date	August 2013
Project Number	Cultural Surveys Hawai‘i, Inc. (CSH) Job Code: KALIHI 23
Investigation Permit Number	The fieldwork for this archaeological inventory survey (AIS) was carried out under annual archaeological permit numbers 11-17, 12-04, and 13-06 issued by the Hawai‘i State Historic Preservation Division/Department of Land and Natural Resources (SHPD/DLNR) per Hawai‘i Administrative Rules (HAR) §13-282.
Project Location and AIS Study Area	The Honolulu High-Capacity Transit Corridor Project (HHCTCP) extends approximately 23 miles (37.0 km) from Kapolei in the west to the Ala Moana Center in the east. The City Center AIS focuses on the eastern-most 4.3 miles (6.9 km) of the overall HHCTCP area. This AIS study area includes all of City Center (Section 4) and the eastern-most portion of Airport (Section 3) of the HHCTCP. The AIS study area is depicted on the 1998 Honolulu U.S.G.S. 7.5-minute topographic quadrangle.
Agencies	Honolulu Authority for Rapid Transportation (HART) of the City and County of Honolulu (City); SHPD; Federal Transit Administration (FTA)
Land Jurisdiction	State, City, and Private. The study area, constituting all of the HHCTCP Section 4 (City Center) and the eastern portion of HHCTCP Section 3 (Airport), is primarily located within existing road rights-of-way owned by the State of Hawai‘i or the City and County of Honolulu, including Dillingham Boulevard, Ka‘aahi Street, Nimitz Highway, Ala Moana Boulevard, Halekauwila Street, Queen Street, and Kona Street. Many of the support facilities along the project corridor are currently located on adjacent privately-owned lands.
Funding	FTA, City
Project Description and Related Ground Disturbance	The project purpose is to provide high-capacity rapid transit in the highly congested east-west transportation corridor between Kapolei and Ala Moana Center via a fixed guideway rail transit system. In addition to the guideway, the project will require construction of transit stations and ancillary support facilities. The nine proposed transit stations within the City Center AIS study area are (1) Middle Street Transit Center Station, (2) Kalihi Station, (3) Kapālama Station, (4) Iwilei Station, (5) Chinatown Station, (6) Downtown Station, (7) Civic Center Station, (8) Kaka‘ako Station, and (9) Ala Moana Center Station. An additional component of the City Center AIS study area is comprised of a utility relocation corridor that extends, from west to east, from Richard Street along Ala Moana Boulevard, up Punchbowl Street,

	along Pohukaina Street and up Cooke Street to Halekauwila Street, where it merges with the guideway alignment. Project construction will also require relocation of existing utility lines within the project corridor that conflict with the proposed project design. Minimally, land-disturbing activities would include grading of facility locations and excavations for guideway column foundations, subsurface utility relocation and installation, and station and ancillary facility foundation construction. The vast majority of the area of disturbance will be due to utility relocation and road widening.
Area of Potential Effect and Survey Acreage	The HHCTCP area of potential effect for archaeological cultural resources is defined in the HHCTCP Programmatic Agreement Final – January 2011 (PA) (Stipulation III.A.1.) as all areas of direct ground disturbance. For the City Center AIS study area (all of Section 4 and the eastern portion of Section 3), HHCTCP project engineers estimate that the project's area of direct ground disturbance is approximately 604,289 square feet (or 13.87 acres). These 13.87 acres are the survey area for this AIS investigation.
Historic Preservation Regulatory Context	Due to federal (FTA) funding and the use of federal (U.S. Navy) lands (in Section 3), this project is a federal undertaking, requiring compliance with Section 106 of the National Historic Preservation Act, the National Environmental Policy Act, and Section 4(f) of the Department of Transportation Act. Through the Section 106 historic preservation review process, the project's lead federal agency, FTA, has determined that the project will have an adverse effect on historic properties currently listed, or eligible for listing, on the National Register of Historic Places (National Register). The Hawai‘i State Historic Preservation Officer (SHPO) concurred with this undertaking effect determination (refer to the project's PA for further documentation). To mitigate the undertaking's potential adverse effect, a PA was executed January 18, 2011, with FTA, Hawai‘i SHPO, the United States Navy, and the Advisory Council on Historic Preservation as signatories, and the City as an invited signatory. PA Stipulation III requires that an archaeological inventory survey plan (AISP) be prepared and approved by the SHPD for each of the four HHCTCP construction sections. An AISP for City Center (Hammatt et al. 2011) was prepared to fulfill PA Stipulation III and was accepted by SHPD on October 25, 2011 (Log No. 2011.2379, Doc. No. 1110NN08). The AISP defines the scope of work and details the proposed methods and sampling strategy for this AIS, in accordance with the requirements for an AISP stated in HAR Chapter 13-275-5(c). Subsequently, consideration was given to an alternate site (Alternate A) for the Kaka‘ako Station located approximately 50 m northeast (*mauka*) of the Kaka‘ako Station location addressed in the Hammatt et al. (2011) AISP for City Center. This alternate station site, and associated minor changes to the immediately adjacent guideway alignment, were addressed in an Addendum AISP (Hammatt et al. 2013). The Addendum AISP was accepted by SHPD

	on March 1, 2013 (Log No. 2013.1958, Doc. No. 1302SL28). Following the approved City Center AISP (Hammatt et al. 2011), as amended in the City Center AISP Addendum (Hammatt et al. 2013), the City Center AIS investigation was completed. This AIS report was prepared in consideration of the *Secretary of the Interior's Standards and Guidelines for Archaeology and Historic Preservation* and to support the project's PA and Section 106 compliance. This AIS investigation also supports the project's historic preservation review under Hawai‘i Revised Statutes (HRS) Chapter 6E-8 and HAR §13-275 governing procedures for historic preservation review for governmental projects, and HAR §13-276 governing standards for archaeological inventory surveys and reports. Following HAR §13-300 and HRS Chapter 6E-43, identified human skeletal remains were treated in consultation among SHPD, the City, the O‘ahu Island Burial Council (OIBC), and cultural descendants from the area. A "*Consultation Protocol for Iwi Kūpuna Discovery During the Archaeological Inventory Survey for the City Center (Construction Phase 4) of the HHCTCP"* (Hammatt 2011) (reviewed and approved by FTA, per the project's PA requirements) was developed during the City Center AISP preparation to facilitate consultation regarding the treatment of identified human skeletal remains in the City Center. This investigation focused exclusively on archaeological cultural resources. Identification of resources and Hawai‘i Register of Historic Places (Hawai‘i Register) and National Register eligibility recommendations for the project area's architectural cultural resources, including historic roads, bridges, and structures, was conducted as a separate effort in association with the project's Final Environmental Impact Statement (FEIS) (USDOT/FTA and City/DTS 2010).
Document Purpose	This AIS investigation was conducted to identify, document, and make Hawai‘i and National Register eligibility recommendations for the study area's archaeological cultural resources[1]. In consultation with the SHPD, this investigation was also designed to fulfill the State requirements for an AIS per HAR §13-276. The report includes an undertaking-specific effect recommendation and treatment/mitigation recommendations for the identified archaeological cultural resources recommended Hawai‘i/National Register-eligible. This document is intended to support project-related historic preservation consultation among stake-holding federal and state agencies, interested Native Hawaiian groups and individuals, and community groups.
Summary of Fieldwork Effort	Fieldwork consisted of pedestrian inspection, ground penetrating radar (GPR) survey, and an archaeological subsurface testing program comprised of machine-assisted test excavations and geotechnical borings. Pedestrian inspection of the City Center AIS study area was carried out on the following three occasions: in (1) May 2011 to support preparation of the

	City Center AISP (Hammatt et al. 2011), (2) November 2011 when the City Center AIS fieldwork began, and (3) February 2013 when the AIS subsurface testing program was completed. Two hundred fifty (250) test excavations (232 original, 9 abandoned, and 27 added test excavations) were documented as part of the City Center AIS (8% more than the 232 test excavations specified as the initial sampling strategy in the City Center AISP). Seven geotechnical borings were carried out under archaeological supervision to investigate specific stratigraphic distributions and boundaries. Each test excavation was surveyed with GPR before its excavation and the post-processed GPR results were compared to the actual excavation results. Fieldwork was carried out under the supervision of Matt McDermott, M.A., and Hallett H. Hammatt, Ph.D. (principal investigators) intermittently between November 2011 and February 2013. Field staff included 33 CSH archaeologists: Jennifer Bellville, Doug Borthwick, Kelly Burke, Rebecca Choi, Erin Coward, Ellen DeLeeuw, Brittany Enanoria, Randy Groza, Alex Hazlett, Nifae (Mana) Hunkin, Kulani Jones, Andrea Kay, Nigel Kingsbury, Fred LaChance, Mandy Lawson, Kimi Matsushima, Leandra Medina, Abbey Mierzejewski, Veronica Morriss, Connie O'Hare, Malina Reveal, Michael (Pablo) Rivera, Craig Schifferns, David Shideler, Andrew Soltz, Ena Sroat, Cary Stine, Doug Thurman, Jon Tulchin, Todd Tulchin, Tyler Turan, Josephine Yucha, and Trevor Yucha. Fieldwork required approximately 6300 person-hours or 785 person-days to complete.
Cultural Resources / Historic Properties[2] Identified and Determined / Recommended Eligibility to the National / Hawai‘i Registers[3]	Nineteen (19) archaeological cultural resources were identified within, or immediately adjacent to, the City Center AIS study area. Twelve of these resources were previously identified and documented, and some have already had their Hawai‘i and/or National Register-eligibility determined. Where this eligibility has not yet been determined for these previously identified cultural resources, eligibility recommendations are given based on available information. The remaining seven were newly identified and documented during the City Center AIS and their Hawai‘i and National Register-eligibility is presented here as a recommendation. All 19 archaeological cultural resources have been assigned Hawai‘i State Inventory of Historic Properties (SIHP) numbers, all with the prefix 50-80-14. They are listed below roughly from west to east. The bold SIHP #s are newly identified as part of the City Center AIS, and the associated test excavations are listed: SIHP #-**7425**, a subsurface fire feature remnant (interpreted as the remains of a single *imu* or earth oven), recommended eligible to both the Hawai‘i and National Registers under Criterion D. T-020. SIHP #-**7426**, a subsurface wetland deposit, recommended eligible to both the Hawai‘i and National Registers under Criterion D. T-054 through T-082, and T-085. SIHP #-**7506**, a subsurface incinerated trash deposit, recommended eligible

	to the Hawai‘i and National Register under Criterion D. T-064, T-066, and T-067. SIHP #-5368, the subsurface remnants of Kūwili Fishpond, previously determined eligible to both the Hawai‘i and National Registers under Criterion D. T-088, T-091, through T-094 SIHP #-5966[4], the subsurface remnants of Kawa Fishpond, previously determined eligible to both the Hawai‘i and National Registers under Criterion D. T-095 within fishpond boundaries but no fishpond sediments observed. SIHP #-**7427**, subsurface infrastructure remnants, subsurface cultural deposits, and a human skeletal element, recommended eligible to both the Hawai‘i and National Registers under Criterion D and eligible to the Hawai‘i Register under Criterion E. T-096 through T-101 and test bores C-1 through C-6. SIHP #-**7428**, a subsurface cultural deposit and historic building foundation, recommended eligible to both the Hawai‘i and National Registers under Criterion D. T-119, T-119A, T-120, T-120A, T-120B. SIHP #-2963, a subsurface cultural deposit, subsurface pond sediments, human burials, and animal burials, recommended eligible to the Hawai‘i Register under Criteria D and E and eligible to the National Register under Criterion D. T-122, T-123, and T-124. SIHP #-7124, subsurface infrastructure remnants, previously determined eligible to the Hawai‘i Register under Criteria A and D, recommended eligible to the Hawai‘i and National Register under Criterion D. T-132. SIHP #-7189, a subsurface burnt trash deposit, previously determined eligible to the Hawai‘i Register under Criteria A and D, recommended eligible to the Hawai‘i and National Register under Criterion D. T-130, T-132, T-134, T-138, T-140, T-231A, T-232, and T-232A. SIHP #–7190, subsurface salt pan remnants, previously determined eligible to the Hawai‘i Register under Criteria A and D, recommended eligible to the National Register under Criterion D. T-229 and T-230. SIHP #-7197[5], a subsurface cultural deposit and fire pit feature, previously determined eligible to the Hawai‘i Register under Criterion A and D and recommended eligible to the National Register under Criterion D. Not observed in current AIS, but potentially affected by project construction due to close proximity. SIHP #-5820, a subsurface cultural deposit and human burials, recommended eligible to the Hawai‘i Register under Criterion D and E and eligible to the National Register under Criterion D. T-141, T-142, T-145, T-146A, T-150, T-151, and T-151A.

	SIHP #-**7429**, subsurface cultural deposit and human skeletal element, recommended eligible to the Hawai‘i Register under Criterion D and E and eligible to the National Register under Criterion D. T-167, T-168, T-168A, T-168B, T-169, T-170, and T-170A. SIHP #-6856, the subsurface remnants of Kolowalu Fishpond previously determined eligible to the Hawai‘i Register under Criterion D, recommended eligible to the National Register under Criterion D. T-181 through T-185 SIHP #-6636, a subsurface deposit (Kewalo wetland), previously determined eligible to the Hawai‘i Register under Criteria A and D, recommended eligible to the National Register under Criterion D. T-186 through T-193, T-195, T-196, T-198 through T-200, T-202, T-202A, T-203, T-205, T-207, T-208, T-210 through T-212, T-214, T-219, and T-220. SIHP #-**7430**, a subsurface privy remnant, recommended eligible to both the Hawai‘i and National Registers under Criterion D. T-202. SIHP #-**7**193, a subsurface trash deposit, previously determined ineligible to the Hawai‘i Register and recommended ineligible to the National Register, recommended eligible to the Hawai‘i Register and National Register under Criterion D. T-214. SIHP #-2918, a subsurface cultural deposit and human burials, recommended eligible to the Hawai‘i Register under Criteria D and E and eligible to the National Register under Criterion D. T-226A, T-226B, T-226C, and T-226D, T-227 and T-227A.
Identified Human Skeletal Remains / Burials, Ethnicity, and Treatment Decision Jurisdiction	Seven City Center AIS test excavations, located within four archaeological cultural resources (SIHP #s-7427, -5820, -7429, and -2918—see above), documented human skeletal remains. These ranged from previously disturbed single bones within imported fill deposits, to complete, previously undisturbed flexed individuals in Jaucas sand deposits. In all cases, the documentation, consultation, and treatment of the remains followed the City Center AISP (Hammatt et al. 2011) and the project's "*Consultation Protocol for Iwi Kūpuna Discovery During the Archaeological Inventory Survey for the City Center (Construction Phase 4)"* (Hammatt 2011). This included immediate notification and consultation with the O‘ahu Island Burial Council (OIBC) Kona representatives, SHPD, HART representatives, and project engineers. Consultation regarding the ethnicity, treatment decision jurisdiction (SHPD or OIBC), and the applicability of Hawai‘i State Burial Law (HRS Chapter 6E-43 and HAR §13-300) is currently underway between SHPD and HART. Consultation with potential and recognized cultural descendants to the remains is on-going, and will likely culminate in a City Center burial treatment plan (per HAR §13-300).
Cultural Consultation Effort	Following the project's PA requirements (Stipulation III. B. and C.) and the AIS requirements of HAR §13-276, cultural consultation was an important component of this AIS report preparation. During the City Center AIS

	fieldwork, and subsequently during the preparation of this AIS report (throughout late 2012 and the first half of 2013), CSH and HART consulted frequently with the OIBC and SHPD regarding the progress and results of the AIS investigation. Presentations to the OIBC at their monthly August, September, October, November, and December 2012, and January, February March, April, May, and June 2013, meetings included updates on the City Center AIS results and the status of AIS report preparation. During this same time period (later 2012 and the first half of 2013) CSH met twice monthly with SHPD to discuss the progress and results of the AIS investigations for City Center. During these discussions in 2013, and in follow up emails, the significance of identified archaeological cultural resources was discussed, along with project effect and mitigation measure recommendations for the City Center AIS report. On February 20th, 2013, CSH and HART met with the Office of Hawaiian Affairs (OHA) and updated their archaeological and cultural staff on the City Center AIS results. During this OHA consultation meeting, CSH staff described the archaeological cultural resources documented, along with their significance and proposed mitigation measures. Additionally, CSH presented updates of the City Center AIS investigation at several meetings (November 8 and 27, 2012, December 17, 2012, February 7, 2013, March 18, 2013, April 11 and 17, 2013, May 15, 2013, and June 5, 2013) arranged to consult with, and seek treatment preferences from potential and recognized lineal or cultural descendants to the human skeletal remains identified during the City Center AIS.
Effect Recommend-ation	As noted above, through the project's Section 106 historic preservation review process, the project has already been determined to have an "adverse effect" on historic properties. The AIS investigation results are in keeping with this federal effect determination because Section 4 will potentially adversely affect portions of the nineteen archaeological cultural resources listed above. Under Hawai‘i State historic preservation review legislation, a project-specific effect recommendation of "effect, with proposed mitigation commitments" is appropriate. The recommended mitigation measures will reduce the project's effect on the archaeological cultural resources within the City Center APE.
Mitigation[6] Recommend-ations	Based on the results of this AIS investigation, proposed archaeological cultural resource mitigation measures for the City Center (Section 4) construction are three-fold: 1) Preparation and implementation of a City Center burial treatment plan per the requirements of HRS Chapter 6E-43 and HAR §13-300. 2) Preparation and implementation of a City Center archaeological monitoring program, per the requirements of HAR § 13-279. The archaeological monitoring program will help identify and properly treat any additional archaeological deposits and/or burials/human skeletal remains found during City Center construction. The specifics

	of the archaeological monitoring program will be codified in an archaeological monitoring plan for the review and approval of the SHPD prior to construction work in City Center. 3) Preparation and implementation of an archaeological data recovery program for SIHP #s -5966, -7427, -7428, -2963, -7190, -5820, -7429, and -2918. The data recovery research design and methods will be presented in a data recovery plan for SHPD review and approval. The appropriate completion of archaeological data recovery work will be verified by SHPD prior to initiation of City Center construction in the vicinity. This mitigation is consistent with the project's PA (Stipulations III D. and III E.) and HAR Chapter 13-275.

*The City Center AIS report is composed of 10 volumes. Volume I is the main document; Volume II presents the cultural, historical, and archaeological background research; Volume III contains pertinent land court documents; Volumes IVA, IVB, IVC, and IVD are the test excavation summaries; Volume V is the laboratory results; Volumes VIA and VIB are ground penetrating radar (GPR) results.

[1]In historic preservation parlance, cultural resources are the physical remains and/or geographic locations that reflect the activity, heritage, and/or beliefs of ethnic groups, local communities, states, and/or nations. Generally, they are at least 50 years old, although there are exceptions, and include: buildings and structures; groupings of buildings or structures (historic districts); certain objects; archaeological artifacts, features, sites, and/or deposits; groupings of archaeological sites (archaeological districts); and, in some instances, natural landscape features and/or geographic locations of cultural significance.

[2]Historic properties, as defined in 36 CFR 800.16, are any prehistoric or historic districts, sites, buildings, structures, or objects included in, or eligible for inclusion in, the National Register of Historic Places maintained by the Secretary of the Interior. This includes artifacts, records, and remains that are related to and located within such properties, as well as properties of traditional religious and cultural importance to an Indian tribe or Native Hawaiian organization and that meet the National Register criteria. Determinations of eligibility are generally made by a federal agency official in consultation with the SHPO. Under federal legislation, a project's (undertaking's) potential effect on historic properties must be evaluated and potentially mitigated. Under Hawai‘i State historic preservation legislation, historic properties are defined as any cultural resources that are 50 years old, regardless of their historic/cultural significance under state law, and a project's effect and potential mitigation measures are evaluated based on the project's potential impact to "significant" historic properties (those historic properties determined eligible, based on their integrity and historic/cultural significance in terms of established significance criteria, for inclusion in the Hawai‘i Register of Historic Places). Determinations of eligibility to the Hawai‘i Register result when a state agency official's historic property "significance assessment" is approved by SHPD, or when SHPD itself makes an eligibility determination for a historic property.

[3]Cultural resource significance is evaluated and expressed as eligibility for listing on the National and/or Hawai‘i Register. To be considered eligible for listing on the National and/or Hawai‘i Register a cultural resource should possess integrity of location, design, setting, materials, workmanship, feeling, and association, and meet one or more of the following broad cultural/historic significance criteria: “A” reflects major trends or events in the history of the state or nation; “B” is associated with the lives of persons significant in our past; “C” is an excellent example of a site type/work of a master; “D” has yielded or may be likely to yield information important in prehistory or history; and, “E” (Hawai‘i Register only) has traditional cultural significance to an ethnic group, includes religious structures and/or burials.

[4]Although test excavation 95 was excavated within the footprint of SIHP #50-80-14-5966, Kawa Fishpond, actual pond sediments or structural remains were not observed during the City Center AIS fieldwork, only fill sediments related to the pond’s infilling. Because the City Center construction will extend through Kawa Fishpond, there is potential for the project to affect this archaeological cultural resource. Accordingly, discussion and evaluation of significance, project effect, and project mitigation related to SIHP #50-80-14-5966 are included in this City Center AIS report.

[5]Although SIHP #50-80-14-7197 was not observed in the City Center AIS, because it was previously identified and documented (Pammer et al. 2011) in close proximity to the City Center APE (the Civic Center Station), and because the geographic extent of #-7197 is only generally understood, it is possible portions of #-7197 will be affected by the construction of City Center Section 4. Accordingly discussion and evaluation of significance, project effect, and project mitigation related to #-7197 are included in this City Center AIS Report.

[6]Under Hawai‘i State historic preservation review legislation, there are the following five potential forms of historic preservation mitigation: (A) Preservation, (B) Architectural Recordation, (C) Archaeological Data Recovery (which includes archaeological monitoring), (D) Historical Data Recovery, and (E) Ethnographic Documentation (HAR §13-275-8).

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Section 1 Introduction

Cultural Surveys Hawai‘i, Inc. (CSH) completed this archaeological inventory survey (AIS) for City Center (Section 4) of the Honolulu High-Capacity Transit Corridor Project (HHCTCP) for the Honolulu Authority for Rapid Transportation (HART) of the City and County of Honolulu (City), and for the Federal Transit Administration (FTA), and on behalf of PB Americas, Inc. (PB). The entire proposed HHCTCP project corridor extends approximately 23 miles (37 km) from East Kapolei in the west to Ala Moana Center in the east. The HHCTCP corridor is divided into four sections. From west to east these are: Section 1, West-O‘ahu/Farrington Highway, extending from East Kapolei to approximately Leeward Community College; Section 2, Kamehameha Highway, extending from Leeward Community College to Aloha Stadium; Section 3, Airport, extending from Aloha Stadium to approximately the Middle Street Interchange; and, Section 4, City Center, extending from Middle Street to Ala Moana Center (Figure 1).

The HHCTCP’s purpose is to provide high-capacity rapid transit in the highly congested east-west transportation corridor between Kapolei and Ala Moana Center via a fixed guideway rail transit system. FTA and the City will fund project construction. In addition to the guideway, the project will require construction of transit stations and ancillary support facilities.

1.1 City Center AIS Background

The focus of this AIS is the eastern-most 6.9 km (4.3 miles) of the overall HHCTCP project corridor: City Center. The City Center AIS study area includes all of Section 4, and, in order to provide continuity, the eastern-most portion of Section 3 (Airport). The AIS City Center study area extends from Kalihi Stream in the west to Ala Moana Center in the east, within Kalihi, Kapālama, Honolulu, and Waikīkī Ahupua‘a, Honolulu (Kona) District, Island of O‘ahu, Tax Map Key (TMK) [1] 1-2, 1-5, 1-7, 2-1, 2-3 (Various Plats and Parcels).

From west to east, the City Center AIS study area begins at Middle Street and extends along Dillingham Boulevard through Kalihi and Kapālama to Ka‘aahi Street. From there it crosses Nuuanu Stream and continues along Nimitz Highway/Ala Moana Boulevard. From the intersection of Richards Street and Ala Moana Boulevard, it continues along Halekauwila Street to Ward Avenue. At Ward Avenue, it angles *mauka* (inland) across the corner of Ward Avenue and Queen Street. Between Ward Avenue and Kamake‘e Street, it continues *makai* (seaward) of Queen Street. At Kamakee Street, it follows the alignment of Queen Street to the intersection with Waimanu Street. There it crosses to Kona Street, which it follows across Pi‘ikoi Street into Ala Moana Center. An additional component of the City Center AIS study area is comprised of a utility relocation corridor that extends, again from west to east, from Richards Street along Ala Moana Boulevard, up Punchbowl Street, along Pohukaina Street and up Cooke Street to Halekauwila Street, where it merges with the guideway alignment. The AIS study area is depicted on the 1998 Honolulu U.S.G.S. 7.5-minute topographic quadrangle, on various TMKs, and an aerial photograph (Figure 2 to Figure 8).

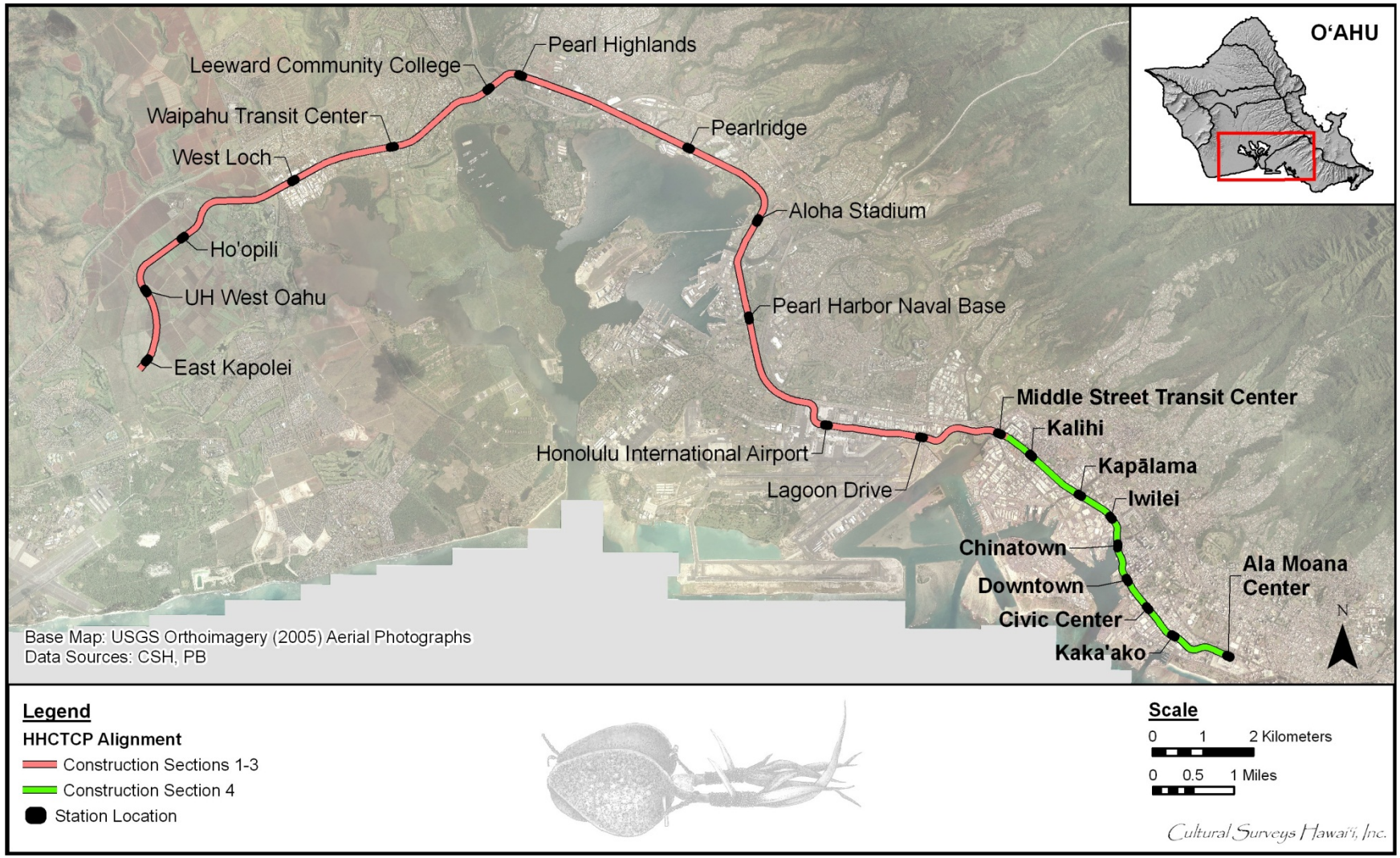

Figure 1. Aerial photograph (source: U.S.G.S. orthoimagery 2005) showing the entire HHCTCP corridor, from East Kapolei to Ala Moana Center, including station locations, with the City Center AIS study area called out in green

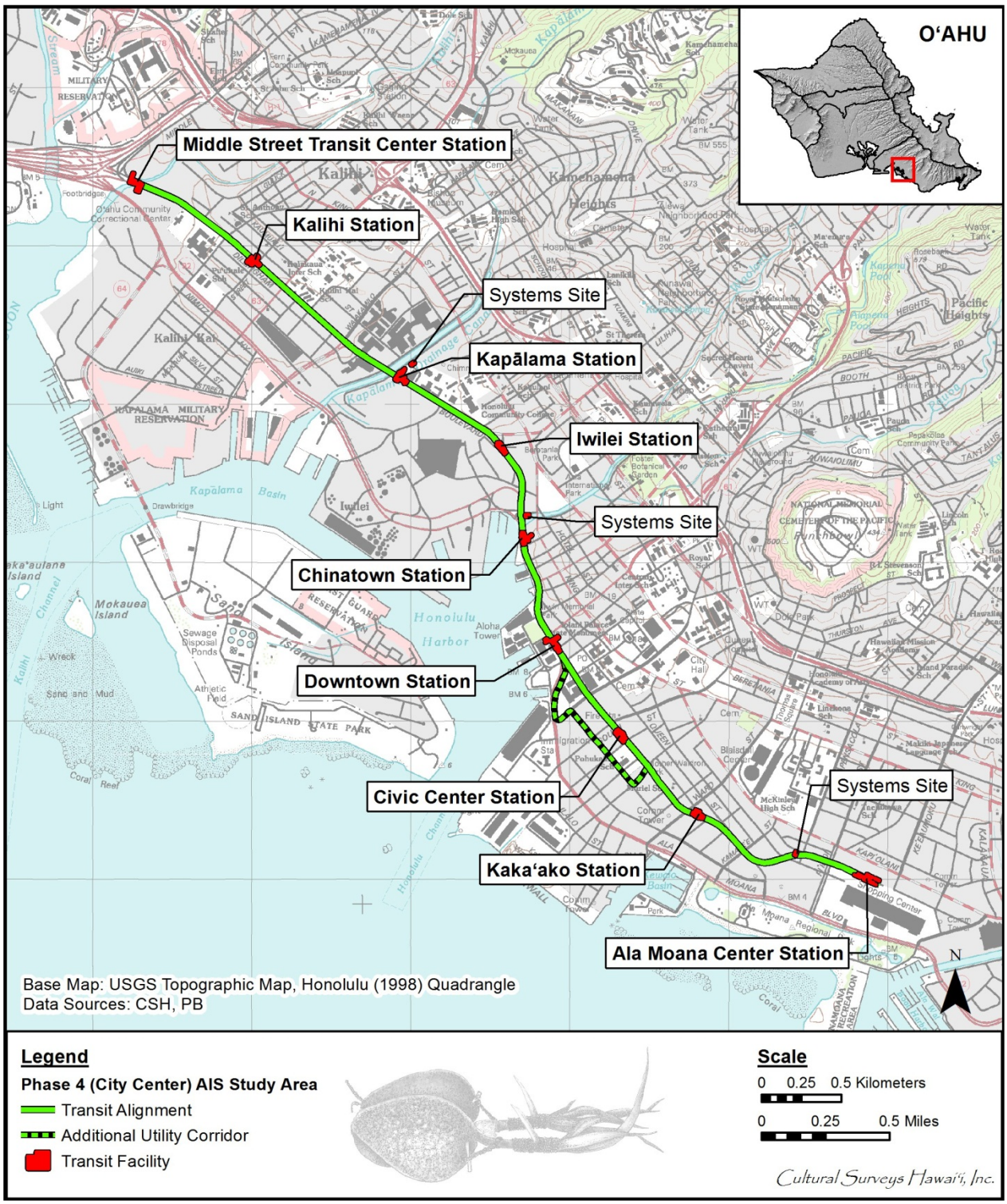

Figure 2. Portion of the 1998 Honolulu U.S.G.S. 7.5-minute topographic quadrangle showing the City Center alignment and related transit facilities

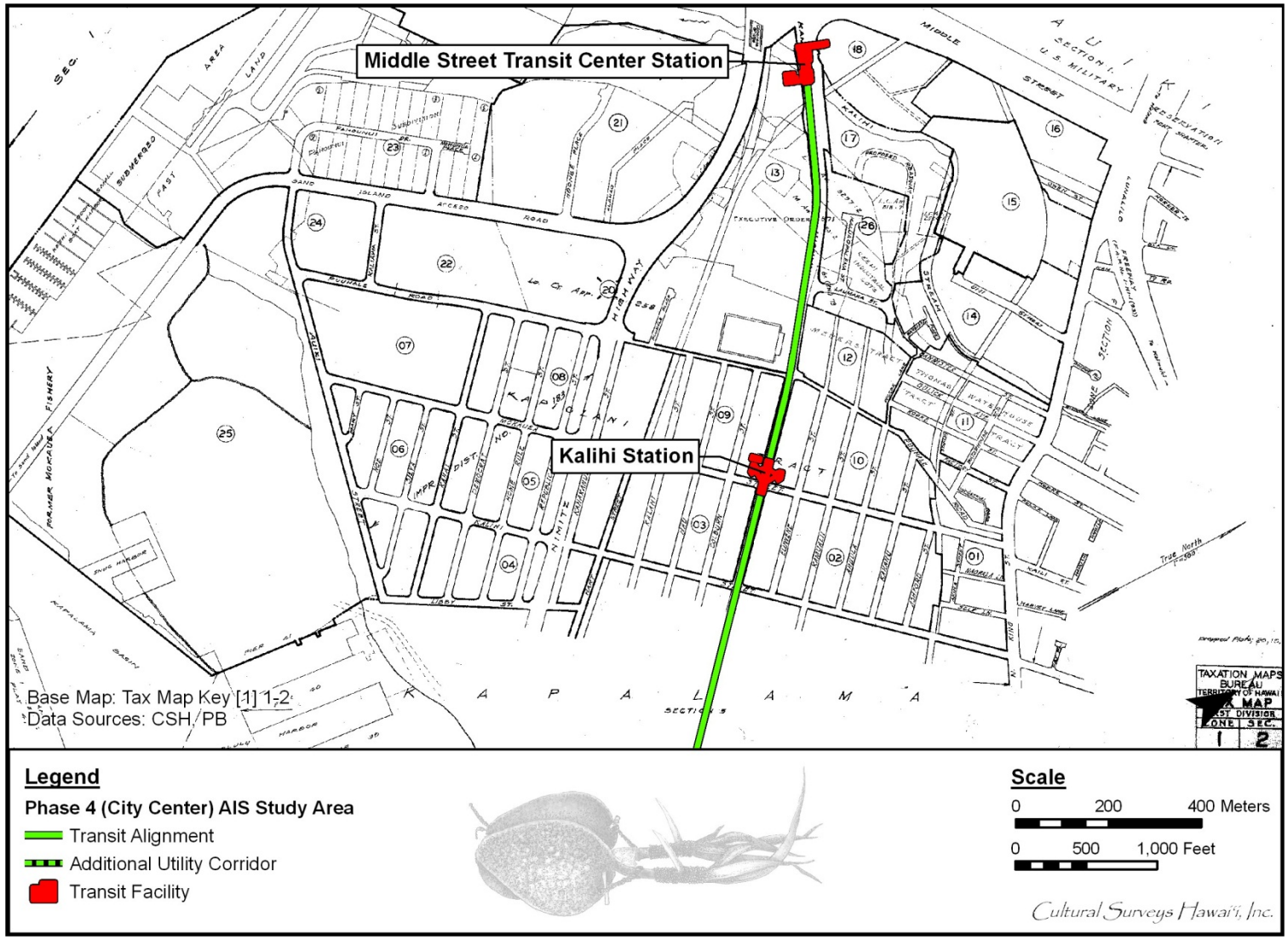

Figure 3. Tax Map Key 1-2 showing the western portion of the City Center AIS study area

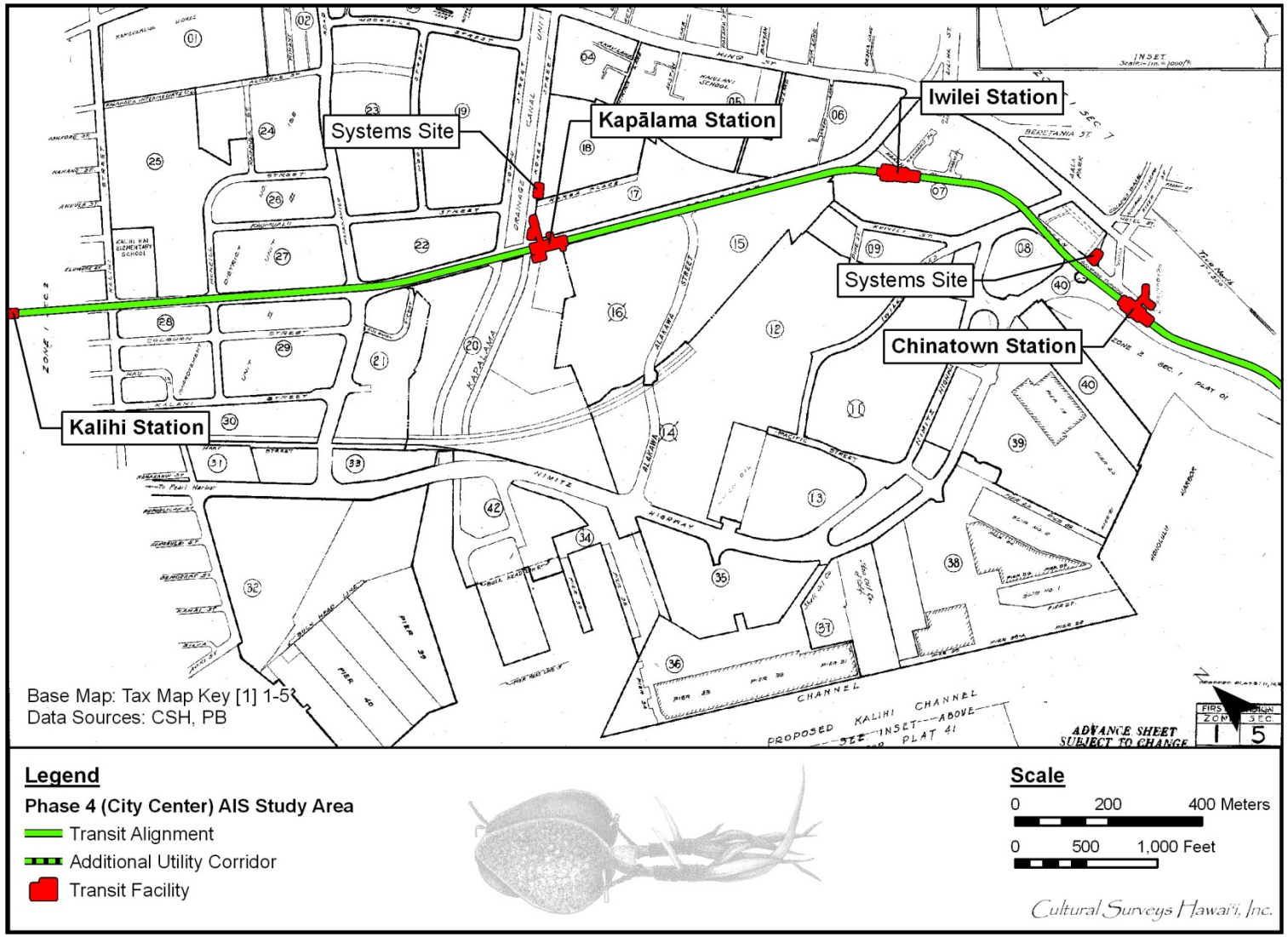

Figure 4. Tax Map Key 1-5 showing the central portion of the City Center AIS study area

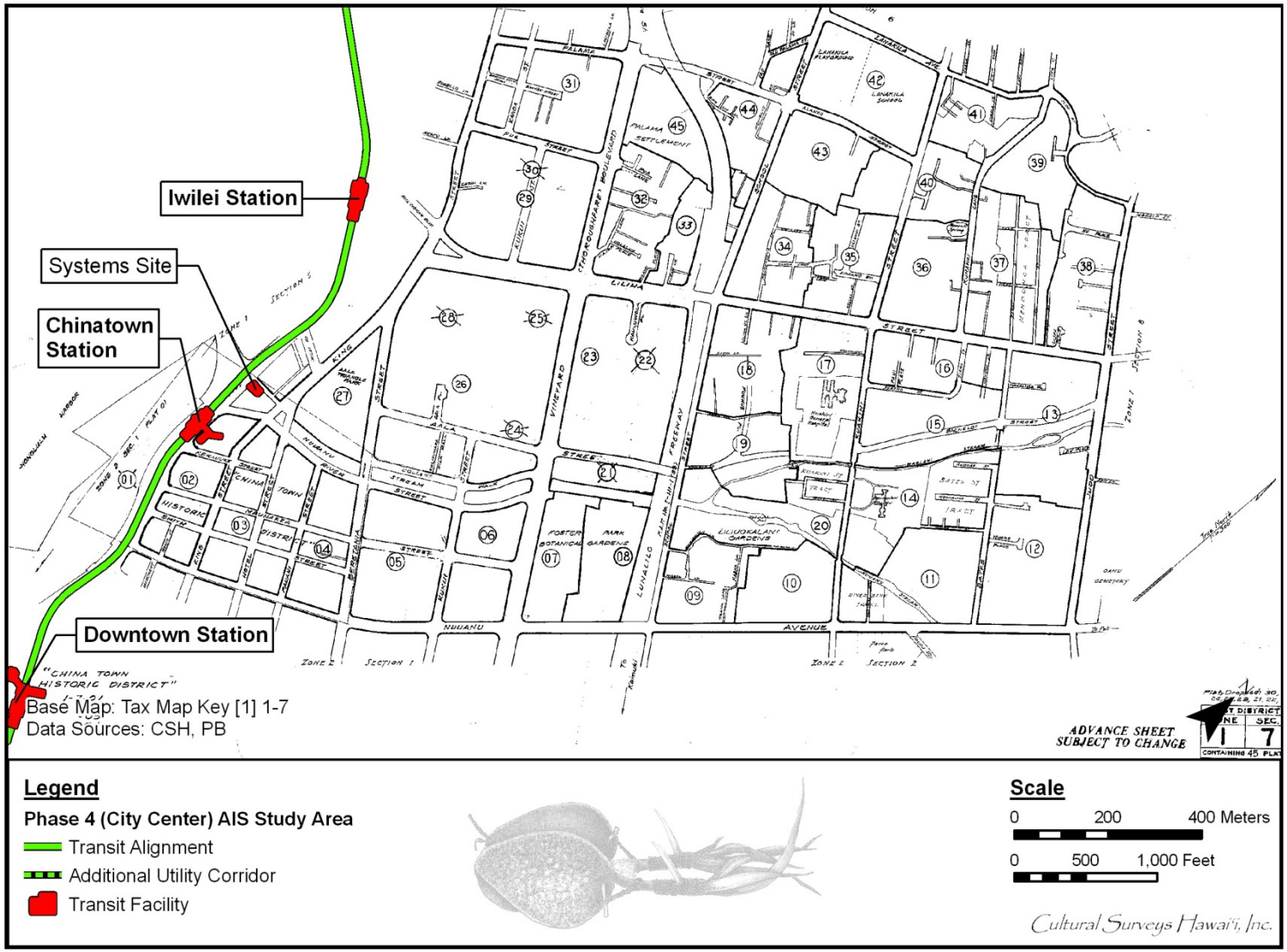

Figure 5. Tax Map Key 1-7 showing the central portion of the City Center AIS study area

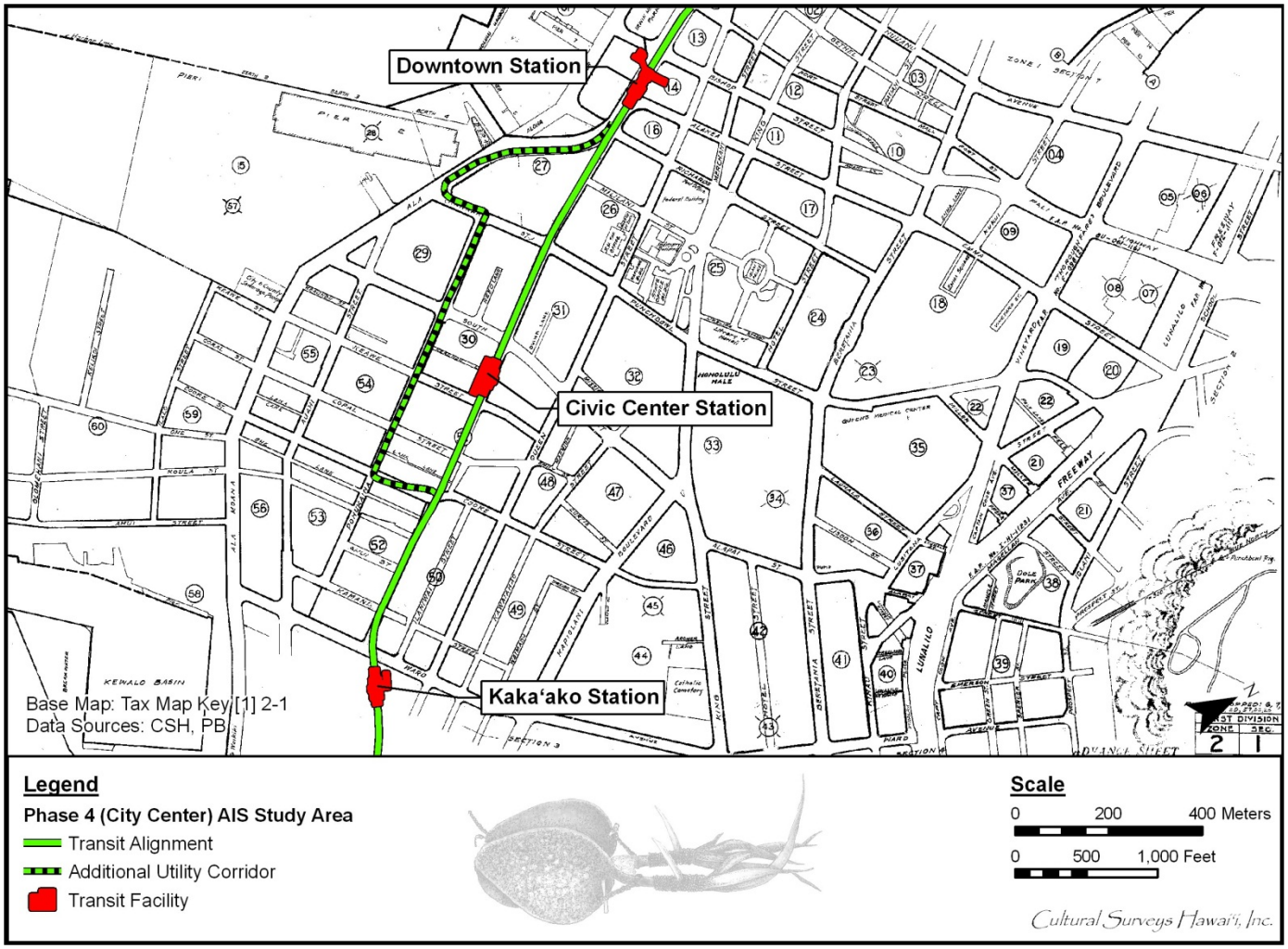

Figure 6. Tax Map Key 2-1 showing the central portion of the City Center AIS study area

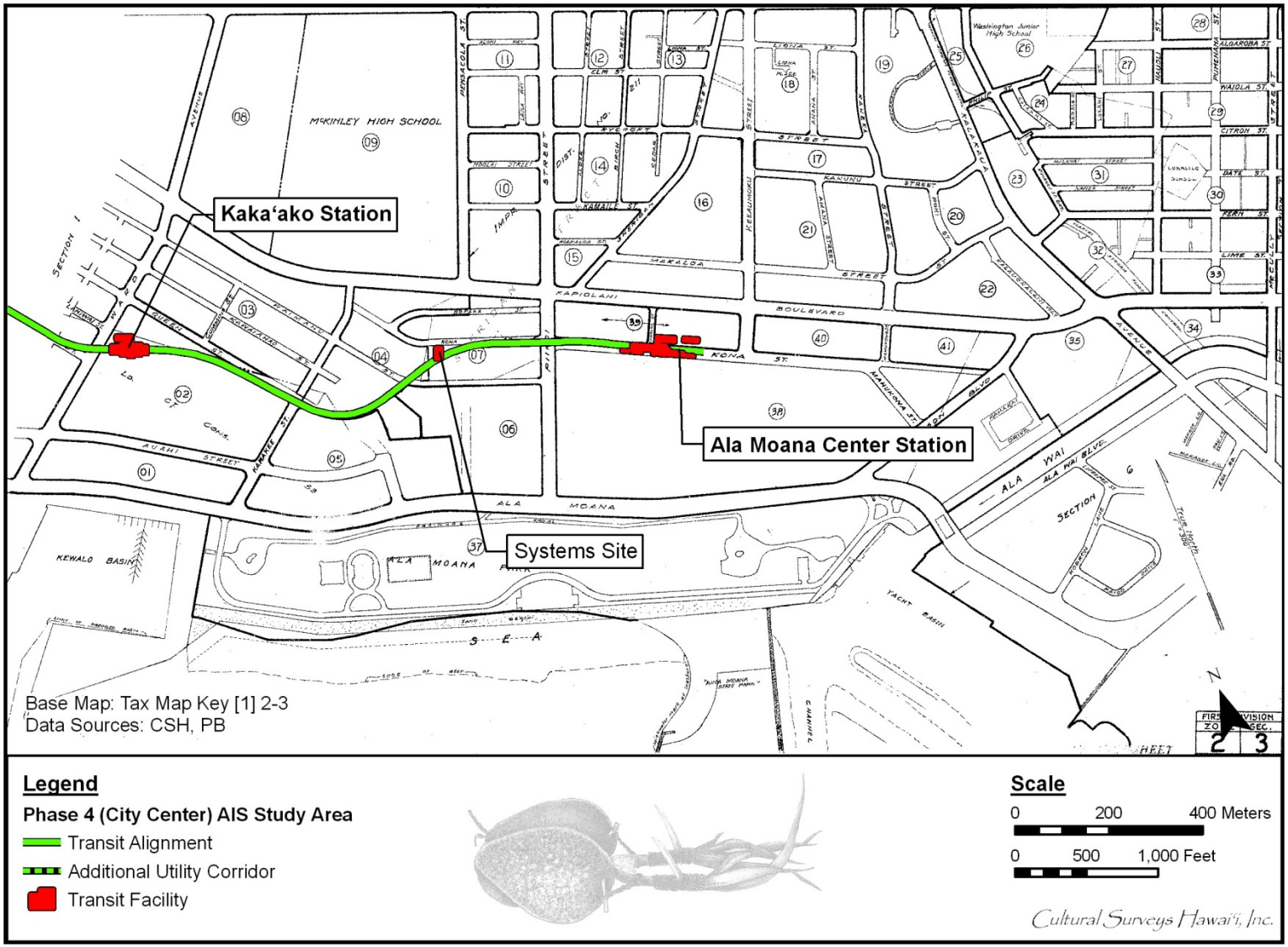

Figure 7. Tax Map 2-3 showing the eastern portion of the City Center AIS study area

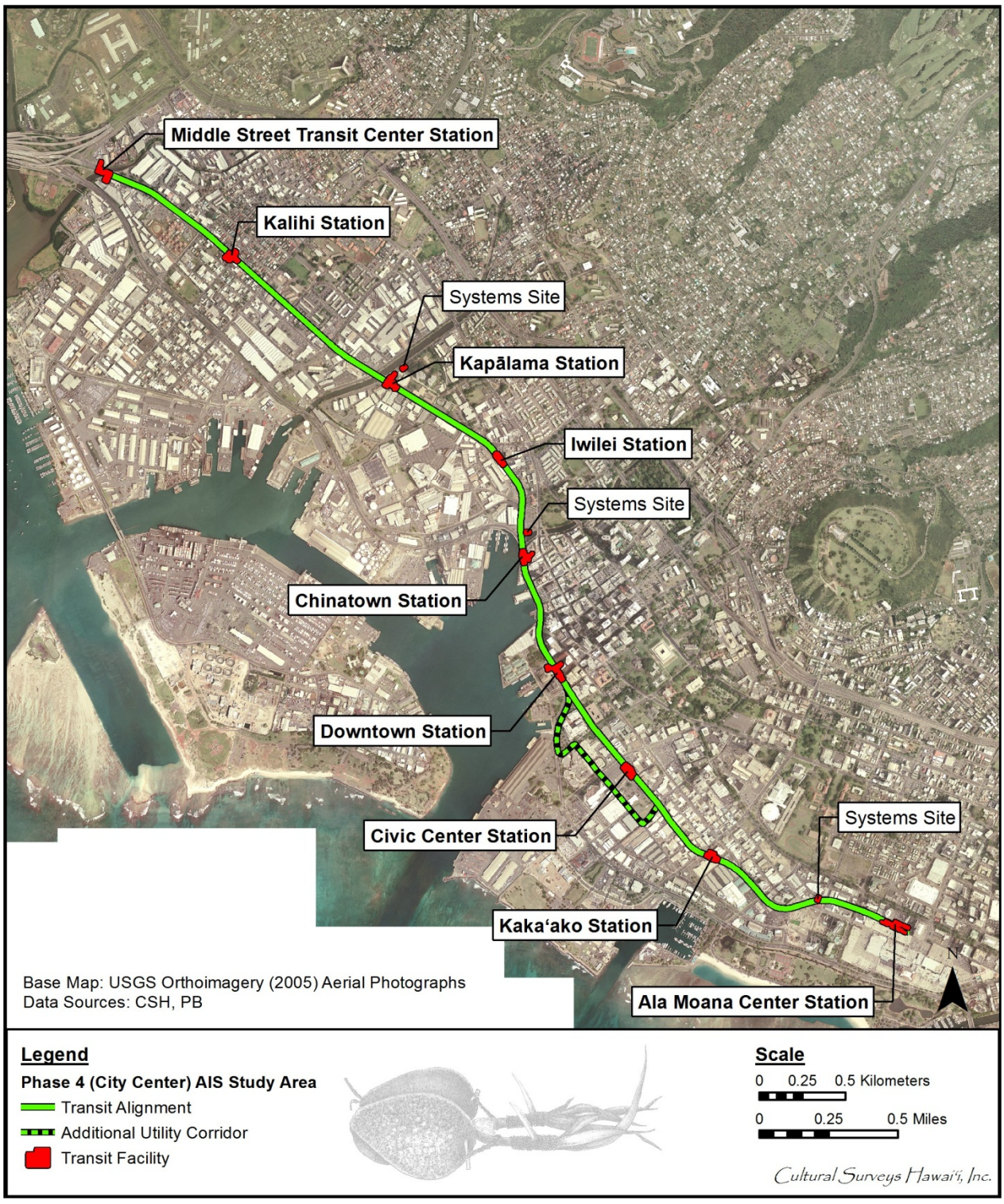

Figure 8. Aerial photograph (source: U.S.G.S. orthoimagery 2005) showing the City Center AIS study area

The AIS City Center study area is primarily located within existing road rights-of-way owned by the State of Hawai‘i or the City and County of Honolulu, including Dillingham Boulevard, Ka‘aahi Street, Nimitz Highway, Ala Moana Boulevard, Halekauwila Street, Queen Street, and Kona Street. Many of the support facilities along the project corridor are located on adjacent privately owned lands.

Nine proposed transit stations are within the City Center AIS study area: Middle Street Transit Center Station; Kalihi Station; Kapālama Station; Iwilei Station; Chinatown Station; Downtown Station; Civic Center Station; Kaka‘ako Station; and Ala Moana Center Station; additionally there are three system sites (smaller alignment infrastructure related to guideway's power supply) (refer to Figure 2 to Figure 8). Project construction will also require relocation of existing utility lines within the project corridor that conflict with the project design. Minimally, land-disturbing activities will include grading of facility locations and excavations for guideway column foundations, subsurface utility relocation and installation, and construction of foundations for stations and ancillary facilities.

1.2 Historic Preservation Regulatory Context

Due to federal (FTA) funding, and use of U.S. Navy lands (in HHCTCP Section 3—Airport), this project is a federal undertaking as defined in 36 CFR 800.16, requiring compliance with Section 106 of the National Historic Preservation Act (NHPA), the National Environmental Policy Act (NEPA), and Section 4(f) of the Department of Transportation Act. Through the Section 106 historic preservation review process, the project's lead federal agency, FTA, has determined that the project will have an adverse effect on historic properties currently listed, or eligible for listing, on the National Register of Historic Places (National Register). The Hawai‘i State Historic Preservation Officer (SHPO) concurred with this undertaking effect determination.

To mitigate the undertaking's potential adverse effect, a Section 106 Programmatic Agreement (PA) was executed on January 18, 2011, with FTA, Hawai‘i SHPO, the United States Navy, and the Advisory Council on Historic Preservation as signatories, and the City as an invited signatory. PA Stipulation III requires that an archaeological inventory survey plan (AISP) be prepared and approved by the SHPD for each of the four HHCTCP construction sections.

An AISP for City Center (Hammatt et al. 2011) was prepared to fulfill PA Stipulation III and was accepted by SHPD on October 25, 2011 (Log No. 2011.2379, Doc. No. 1110NN08). The AISP defines the scope of work and details the proposed methods and sampling strategy for this AIS, in accordance with the requirements for an AISP in Hawai‘i Administrative Rules (HAR) Chapter §13-275-5(c).

Subsequently consideration was given to an alternate site (Alternate A) for the Kaka‘ako Station located approximately 50 m northeast (*mauka*) of the Kaka‘ako Station location addressed in the AISP for City Center (Hammatt et al. 2011). This alternate station site, and associated minor changes to the immediately adjacent guideway alignment, were addressed in an Addendum AISP (Hammatt et al. 2013). The Addendum AISP was accepted by SHPD on March 1, 2013 (Log No. 2013.1958, Doc. No. 1302SL28). These changes to the guideway alignment are discussed in Section 3 of this volume. The up-to-date City Center guideway alignment/project footprint is shown on all appropriate figures.

Following the approved City Center AISP (Hammatt et al. 2011), as amended in the City Center AISP Addendum (Hammatt et al. 2013), the City Center AIS investigation was completed. This AIS report was prepared in consideration of the *Secretary of the Interior's Standards and Guidelines for Archaeology and Historic Preservation* and to support the project's PA and Section 106 compliance. This AIS investigation also supports the project's historic preservation review under Hawai‘i Revised Statutes (HRS) Chapter 6E-8 and HAR §13-275 governing procedures for historic preservation review for governmental projects, and HAR §13-276 governing standards for archaeological inventory surveys and reports

Following HAR §13-300 and HRS Chapter 6E-43, identified human skeletal remains were treated in consultation among SHPD, the City, the O‘ahu Island Burial Council (OIBC), and cultural descendants from the area. A "*Consultation Protocol for Iwi Kūpuna Discovery During the Archaeological Inventory Survey for the City Center (Construction Phase 4) of the HHCTCP*" (Hammatt 2011) (reviewed and approved by FTA, per the project's PA requirements) was developed during the preparation of the City Center AISP to facilitate consultation regarding the treatment of identified human skeletal remains. This consultation protocol (Hammatt 2011) was implemented during the City Center AIS fieldwork.

CSH completed an AIS of HHCTCP Section 1 (extending east from the East Kapolei Station to approximately Leeward Community College), in February 2010. It was reviewed and accepted by SHPD on April 19, 2010 (Log No. 2010.1749, Doc. No. 1004MV01).

CSH completed an AIS of HHCTCP Section 2 (extending east from Leeward Community College to approximately Aloha Stadium) in May 2012. It was reviewed and accepted by SHPD on May 23, 2012 (Log No. 2012.1449, Doc. No. 1205NN23).

CSH completed an AISP for HHCTCP Section 3 (extending from Aloha Stadium to Middle Street/Kalihi Stream). It was reviewed and accepted by SHPD on December 2, 2011 (Log No. 2011.2167, Doc. No. 1211NN01). At the time of writing this report (March 2013) the AIS report for Section 3 (Airport) is under SHPD review.

The HHCTCP area of potential effect (APE) for archaeological cultural resources is defined in the HHCTCP PA (Stipulation III.A.1.) as all areas of direct ground disturbance. For the City Center AISP study area (all of Section 4 and the eastern portion of Section 3), project engineers estimate that the project's area of direct ground disturbance is approximately 604,289 square feet (or 13.87 acres). These 13.87 acres are the survey area for this City Center AIS investigation.

This AIS investigation was conducted to identify, document, and make National Register and Hawai‘i Register of Historic Places (Hawai‘i Register) eligibility recommendations for the study area's archaeological cultural resources. In consultation with the SHPD, this investigation was also designed to fulfill the State requirements for an AIS per HAR §13-276. The investigation includes an undertaking-specific effect recommendation and treatment/mitigation recommendations for the identified archaeological cultural resources recommended National/Hawai‘i Register eligible. This document is intended to support project-related historic preservation consultation among stake-holding federal and state agencies, interested Native Hawaiian groups and individuals, and community groups.

This City Center AIS investigation focused exclusively on archaeological cultural resources. Identification and National/Hawai‘i Register eligibility recommendations for the HHCTCP

architectural cultural resources, including historic roads, bridges, and structures, was conducted as a separate effort in association with the project's Final Environmental Impact Statement (FEIS) (USDOT/FTA and City/DTS 2010).

Generally, under both Hawai‘i State and federal historic preservation legislation, archaeological inventory surveys are designed to identify, document, and collect enough data to evaluate the significance of potential "historic properties." As discussed in the paragraphs below, there are important distinctions between the Federal and Hawai‘i State definitions of "historic property." To alleviate any confusion these different definitions might cause, CSH has opted in this document to use the more generic term "cultural resources" and as defined below, in its discussion of the cultural remains within the current study area. The use of the term cultural resources in these instances is common practice in cultural resource management and is in keeping with the historic preservation requirements/definitions of both 36 Code of Federal Register 800 (36 CFR 800) and HAR §13-275.

In historic preservation parlance, cultural resources are the physical remains and/or geographic locations that reflect the activity, heritage, and/or beliefs of ethnic groups, local communities, states, and/or nations. Generally, they are at least 50 years old, although there are exceptions, and include: buildings and structures; groupings of buildings or structures (historic districts); certain objects; archaeological artifacts, features, sites, and/or deposits; groupings of archaeological sites (archaeological districts); and, in some instances, natural landscape features and/or geographic locations of cultural significance.

Historic properties, as defined in 36 CFR 800.16, are any prehistoric or historic districts, sites, buildings, structures, or objects included in, or eligible for inclusion in, the National Register maintained by the Secretary of the Interior. This includes artifacts, records, and remains that are related to and located within such properties, as well as properties of traditional religious and cultural importance to an Indian tribe or Native Hawaiian organization and that meet the National Register criteria. Determinations of eligibility are generally made by a federal agency official in consultation with the SHPO. Under federal legislation, a project's (undertaking's) potential effect on historic properties must be evaluated and potentially mitigated.

Under Hawai‘i State historic preservation legislation, historic properties are defined as any cultural resources that are 50 years old, regardless of their significance under state law, and a project's effect and potential mitigation measures are evaluated based on the project's potential impact to "significant" historic properties (those historic properties determined eligible, based on established significance criteria, for inclusion in the Hawai‘i Register). Determinations of eligibility to the Hawai‘i Register result when a state agency official's historic property "significance assessment" is approved by SHPD, or when SHPD itself makes an eligibility determination for a historic property.

1.1 Overview of Proposed Project Construction

The design, method of construction, and timeline of the project continue to be refined. This overview of proposed project construction is a synopsis of the information provided in Appendix E—Construction Approach of the HHCTCP Final Environmental Impact Statement (FEIS) (USDOT/FTA and C&C/DTS 2010). [Note: this is the same overview that was included in the SHPD-approved City Center AISP (Hammatt et al. 2011).]

1.1.1 Fixed Guideway and Transit Stations

The HHCTCP involves construction of a fixed guideway rail transit system that will consist primarily of elevated structures. The main components of the fixed guideway system are the elevated guideway structure, guideway foundation columns, and transit stations. The guideway foundation columns generally consist of a single eight foot diameter column spaced, on average, about every 120 feet, with shorter or longer spans used where needed. Transit stations generally consist of elevated platform structures with ground-level entrance buildings. The subsurface impacts associated with the fixed guideway and transit stations will be primarily associated with excavations for the guideway foundation columns and excavations associated with construction of ground-level station buildings, including subsurface utilities, elevator shafts, etc.

Two methods will be used to construct the guideway foundations, dictated by structural demands and existing subsurface conditions. Drilled shafts are the preferred foundation excavation method, which involves drilling with a 6- to 10-foot diameter auger to depths of 50 to 150 feet; installation of a rebar cage in the shaft; and filling the shaft with concrete. Driven-pile foundations will be constructed where lateral loads, geotechnical, or other site conditions prohibit the use of drilled shafts. Construction of driven-pile foundations involves excavations to accommodate the pile cap, pile driving by striking the pile with a heavy weight, vibrating the pile or jacking the pile into the ground, and forming and casting the pile cap with concrete.

1.1.2 Support Facilities

Ancillary support facilities for the transit system include maintenance and storage facilities and traction power substations. These facilities will be constructed at ground level, adjacent to the transit corridor. Subsurface impacts will include grading of the facility locations and excavations for building foundations, subsurface utility installation or relocation, and landscaping. On figures these ancillary support facilities are called out as system sites.

1.1.3 Ancillary Impacts

Project construction will require relocation of existing utility lines within the project corridor that conflict with the project design. The nature and extent of utility relocations, based on preliminary engineering, are shown in Table 1. Current estimates are that the vast majority of subsurface impacts will be ancillary (particularly for utility relocation, roadway widening, and building demolition, refer to Table 1).

Guideway foundation excavations will extend below the water table, potentially creating significant need for the management of displaced water and/or drilling slurry. De-watering pits may be excavated to temporarily collect and treat wastewater and drilling slurry prior to reuse or disposal.

Construction staging areas will be needed to provide adequate space for construction equipment, stockpiling and transfer of construction materials, parking, and other construction-related activities. The proposed ancillary maintenance and storage facility area and transit stations have been identified as potential staging areas. Grading of the construction staging areas may be necessary.

1.1.4 Summary of Subsurface Impacts

While construction of the "touch down" facilities of the transit stations (the portions of the mostly elevated transit stations that are at ground/street level) and the excavations for the column foundations for the fixed guideway may be the most obvious project-related subsurface impacts, according to available data (Table 1) collectively these will only account for an estimated 3.9 percent of the area of project-related subsurface impacts.

Table 1. Summary of Total Area of Disturbance Anticipated for Different Aspects of City Center Construction (Est. 604,289 ft^2 Total)

Components	Area (ft^2)	Percent of Project-related Ground Disturbance
Utilities (wet)	86,597	14.3
Utilities (dry)	280,210	46.4
Traction Power Substation	20,916	3.5
Fiber Optic Cables	20,100	3.3
Building Demolition	68,851	11.4
Roadway Widening	103,410	17.1
Traffic Signals	1,179	0.2
Stations	11,222	1.9
Columns	11,804	2.0

The utility relocations needed for this project are considerable. The "dry" utilities, including electric and gas line relocations, are estimated to account for nearly half (46.4 percent) of the project-related subsurface impacts. The "wet" utility relocations, including water, sewer, and storm sewer improvements, are anticipated to account for approximately 14 percent of the project-related subsurface impacts. Road widening work will largely occur on the *makai* side of Dillingham Boulevard and this is anticipated to account for approximately 17 percent of the project-related subsurface impacts. Because of the medial placement of column foundations along much of the Dillingham Boulevard alignment, the thoroughfare will effectively become largely divided with the *makai* lanes needing to be widened approximately 10 feet farther *makai* (the actual extent of the widening will vary).

Current plans call for demolition of existing buildings in a number of areas, including: Iwilei, between the intersection of Queen and Waimanu Streets, and the vicinity of the intersection of Pensacola and Kona Streets. Demolition is anticipated to account for approximately 11 percent of project-related subsurface impacts. Existing building demolition will include excavations to remove building foundations and associated utilities and grading of the cleared land surface once demolition is done.

1.2 Division of the City Center AIS Study Area into Geographic Zones

The City Center AIS's study area is long and linear, as would be expected for a fixed-guideway transportation system like the HHCTCP. City Center's large (13.87 acres), dispersed (6.9 km/4.3 miles) study area was identified in the City Center AISP (Hammatt et al. 2011:iii) as one of the greatest factors limiting the AIS investigation effort. The linear, dispersed configuration of the study area did hamper the AIS study's execution because each portion of the study area (practically each excavation location) had its own challenges regarding right of entry, traffic management, utility avoidance, etc., that greatly exceeded a more typical 13-acre AIS investigation for a consolidated project area owned by a single landowner. The linear, dispersed nature of the guideway alignment does increase the information value of the AIS study in that it provides a long cross section through the majority of the most archaeologically-sensitive portion of O‘ahu's South Shore. This cross section traverses four *ahupua‘a* (traditional Hawaiian land division) and passes through distinct environmental and cultural settings.

For organization and results presentation, as well as to provide a suitable context to interpret the results of test excavations and the significance of identified archaeological cultural resources, the 6.9 km of the City Center AIS study area were divided into 11 geographic zones. The boundaries of the 11 geographic zones were based on background research and fieldwork results. Grouped together were areas with similar stratigraphy and geomorphology, and, where feasible, areas within traditional Hawaiian *ahupua‘a* (land divisions). To be clear, the geographic zones technically are limited to the project APE (areas of actual ground disturbance), which is a relatively narrow focus; however, the geographical and cultural contextual information provided for each geographic zone covers a wider area to assist in investigation results interpretation. The following is a description of the 11 geographic zones (Figure 9), proceeding generally from west to east:

The West Kalihi Geographic Zone is within Kalihi Ahupua‘a, along the eastern margins of Kalihi Stream. Observed stratigraphy in test excavations consisted of relatively thick fill layers over Kalihi Stream estuary sediments found near the water table. Elevations are typically low, 1.5 to 3 meters above mean sea level. West Kalihi extends approximately 0.5 km along Kamehameha Highway and is bounded to the west by the Middle Street exit from Kamehameha Highway and on the east by Laumaka Street. West Kalihi's eastern boundary is the edge of the emerged Pleistocene reef limestone common along southern O‘ahu. The West Kalihi Geographic Zone is distinct from the immediately adjacent geographic zones to the east because of the estuary sediments encountered.

From West Kalihi, the AIS study area ascends slightly up onto the Pleistocene reef limestone formed during the 7.5 m (Waimānalo) sea-stand (Macdonald et al. 1983:420–421). Both the East Kalihi and West Kapālama Geographic Zones are situated on this slightly elevated limestone surface. Elevations increase from the relatively low-lying Kalihi Estuary to 4.75 to 7.25 m above mean sea level. East Kalihi extends approximately 0.7 km along Kamehameha Highway and Dillingham Boulevard, from Laumaka Street on the west to Kalihi Street on the east. The West

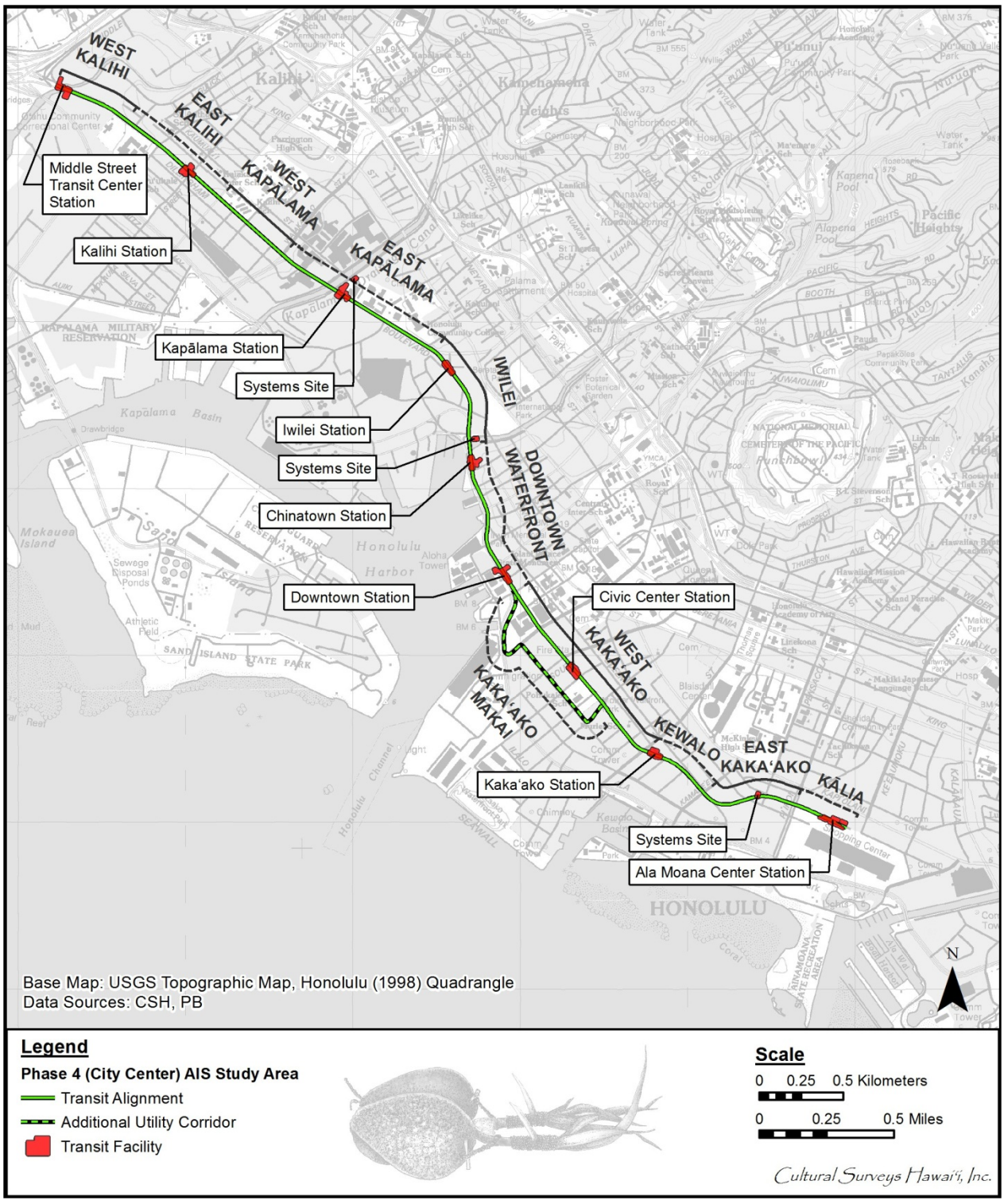

Figure 9. Portion of the 1998 Honolulu U.S.G.S. 7.5-minute topographic quadrangle showing City Center's 11 geographic zones along with the nine City Center Stations

Kapālama Geographic Zone extends approximately 0.5 km along Dillingham Boulevard and is bounded to the west by Kalihi Street and to the east by Waiakamilo Road. In both East Kalihi and West Kapālama similar stratigraphy was observed in test excavations: relatively thin fill layers, over ‘Ewa silty clay loam alluvium, over the Pleistocene coral limestone bedrock. In many areas, this bedrock was less than a meter below the current ground surface. At the eastern boundary of the West Kapālama Zone, at Waiakamilo Road, this limestone bedrock is exposed on the surface. The boundary between East Kalihi and West Kapālama is Kalihi Street, which follows generally the traditional Hawaiian land division between Kalihi and Kapālama Ahupua‘a.

East of Waiakamilo Road, the City Center AIS study area descends off of the Pleistocene limestone ridge down into the relatively low-lying areas within the *makai* drainages of Niuhelewai (currently channelized/rerouted, refer to discussion in Volume II) and Kapālama Streams. East Kapālama Geographic Zone extends approximately 1.0 km along Dillingham Boulevard from Waiakamilo Road at the west end to Akepo Lane at the east end. The western third of the East Kapālama Zone corridor is within Kapālama Ahupua‘a, while the eastern two-thirds of the corridor are within Honolulu Ahupua‘a. Elevations within the East Kapālama Zone range from approximately 1.3 to 2.1 m above mean sea level. At either end of the zone, the Pleistocene limestone shelf is exposed above the modern land surface. Within the zone observed stratigraphy consisted of thick layers of historic and modern fill over clayey, organically-enriched wetland sediments, which, based on AIS results, were extensively used for wetland agriculture (first taro, then rice). These former agricultural sediments are found within 0.2–0.5 m above the water table, indicating that before massive fill episodes, this area was extremely low-lying.

At the eastern boundary of the East Kapālama Zone, the City Center AIS study area effectively meets the old O‘ahu coastline, before episodes of historic fill drastically changed the Iwilei region. The 0.65 km of the Iwilei Geographic Zone extends from Dillingham Boulevard, just east of Akepo Lane at the north end, and curves south to the intersection of Nimitz Highway with Nu‘uanu Stream at the south end. The Iwilei Geographic Zone is entirely within the contiguous footprints of two traditional Hawaiian fishponds that were filled as part of land reclamation in the late ninetieth century: Kūwili Fishpond to the north and Kawa Fishpond to the south, closer to Nu‘uanu Steam. The Iwilei Zone is entirely within Honolulu Ahupua‘a. As can be expected from these reclaimed lands, elevations within the Iwilei Geographic Zone are low, between 1.5 to 1.8 m above mean sea level, and the observed stratigraphy consists of multiple historic and modern fill deposits, sometimes overlying marine/estuary sediments at the water table.

After crossing Nu‘uanu Stream the City Center AIS study area extends approximately 0.9 km along Nimitz Highway/Ala Moana Boulevard, between Nu‘uanu Stream and Richards Street, along the Downtown Honolulu Waterfront. The elevations within the Downtown Waterfront Geographic Zone range from approximately 1.9 to 2.4 m above mean sea level, and much of the zone consists of former off-shore areas that were filled/reclaimed in the latter half of the nineteenth century as part of the development of Honolulu Harbor. The stratigraphy observed in the zone consisted of thick fill layers over marine sediments at the northern and southern ends, with fill over Pleistocene limestone in the central portion. The Downtown Waterfront Zone is located entirely within Honolulu Ahupua‘a. This area was the site of the early development of

the Village of Kou into the Port of Honolulu, and the zone passes through or is immediately adjacent to sites important in the development of Honolulu, such as the family compound of Francisco Marin (advisor to Kamehameha I), the Kamehameha I royal residential compound at Pakaka, and the Honolulu Fort (1816–1857).

The remaining five geographic zones to the east are all located in fairly similar geologic and cultural settings. They are all part of the coastal Honolulu Plain, which is stratified with late-Pleistocene coral reef substrate overlaid with calcareous marine sand or terrigenous sediments, and stream-fed alluvial deposits (Armstrong 1983:36). Before its infilling as a part of land reclamation in the late nineteenth and early twentieth centuries, the relatively low-lying area was a mosaic of Jaucas sand berms, often forming swales, open water ponds, and marshy areas. Native Hawaiians used the area for salt making, aquaculture, wet-land agriculture, habitation, and burial interment, and many of these uses continued into the late ninetieth and early twentieth centuries, at least in some areas. Stratigraphy observed within these geographic zones consisted of fill layers over the old, natural, pre-fill, land surface, which consists variably of Jaucas sand, sandy clay marsh/wetland sediments, or pond sediments. Previous research has documented that the buried Jaucas sand deposits sometimes contain burials (both pre- and post-Contact) and remnants of pre-Contact and post-Contact habitation. Remnants of fishponds, wetland agriculture, and salt making are also indicated based on past research.

At the intersection of Ala Moana Boulevard and Richards Street, the City Center AIS study area follows Halekauwila Street into Kaka‘ako. The West Kaka‘ako Geographic Zone extends approximately 1.25 km along Halekauwila Street from Richards Street to Ward Avenue. The West Kaka‘ako Zone is located within Honolulu Ahupua‘a. Elevations along the West Kaka‘ako Zone range from approximately 1.2 to 1.9 m above mean sea level, with a slight increase in elevation to the west. Stratigraphy observed consisted of fill layers over Jaucas sand, sandy clay marsh/wetland sediments, or pond sediments.

The Kewalo Geographic Zone extends 0.5 km from Ward Avenue to Kamake‘e Street. In this zone the City Center AIS study area is located *makai* of Queen Street, within Honolulu Ahupua‘a. The Kewalo Zone is situated along the low-lying coastal flats immediately inland of present day Kewalo Basin (approximately 500 m inland from the natural coastline at the edge of today’s Ala Moana Boulevard). Elevations in the zone range from approximately 1.3 m to 2.2 m above mean sea level. As with the West Kaka‘ako Geographic Zone, stratigraphy observed consisted of fill layers over the old land surface, comprised of Jaucas sand, sandy clay marsh/wetland sediments, and/or pond sediments.

Further to the east, the East Kaka‘ako Geographic Zone extends 0.5 km from Kamake‘e Street to Pi‘ikoi Street, within Honolulu Ahupua‘a. The central portion of this zone is within the historic Kolowalu Fishpond. Elevations in the zone range from 1.3 to 1.8 m above mean sea level. Observed stratigraphy consisted predominantly of fill sediments over fine-grained alluvial pond sediments and sandy-clay marsh/wetland sediments.

Pi‘ikoi Street generally marks the boundary between Honolulu and Waikīkī Ahupua‘a, and therefore the Kālia Geographic Zone is located within the westernmost portion of Waikīkī Ahupua‘a. The Kālia Geographic Zone extends 0.4 km east from Pi‘ikoi Street to the HHCTCP terminus, *mauka* of Ala Moana Center. Elevations in the zone range from approximately 1.4 to

2.4 m above mean sea level. Observed stratigraphy included fill sediments over sandy-clay marsh/wetland sediments.

The Kaka‘ako Makai Geographic Zone consists of the 1.25 km utility relocation corridor that extends, from west to east, from Richards Street along Ala Moana Boulevard, up Punchbowl Street, along Pohukaina Street, and up Cooke Street to Halekauwila Street. The Kaka‘ako Makai Zone is located within the central portion of Honolulu Ahupua‘a and elevations range from approximately 1.4 to 1.9 m above mean sea level. Based on historic maps, the portion of the zone along Ala Moana Boulevard was off-shore until historic land reclamation filled in this area as part of the development of Honolulu Harbor. The *makai* portions of this geographic zone, at the intersection of Ala Moana Boulevard and Punchbowl Street, were on the natural, pre-land reclamation shoreline. As with the West Kaka‘ako Geographic Zone, stratigraphy observed consisted of fill layers over the old land surface, comprised of Jaucas sand, sandy clay marsh/wetland sediments, and/or pond sediments.

1.3 City Center AIS Report Organization

During the preparation of the AISP for City Center (Hammatt et al. 2011), it was clear that the City Center AIS report would be a massive document. The AISP scope of work and methods/sampling strategy (described in Sections 2 and 3) called for extensive subsurface testing and universal GPR-survey for all excavation areas, with detailed comparison of excavation and GPR survey results. Additionally there was the need for extensive laboratory analysis and reporting of results. These requirements alone promised an AIS report running into the thousands of pages, considering the well over 200 individual test excavations that were planned.

With the AIS report already slated for multiple volumes because of the number of pages needed for basic AIS results reporting, in consultation with SHPD and HART, it was decided to include the detailed background information presented in the City Center AISP (Hammatt et al. 2011) as part of the AIS report. Following Hawaii State archaeological inventory survey guidelines (HAR Chapter 13-276-5(b)(3), this background information, comprised of the previous archaeology, the cultural/historic background summary, and the settlement pattern analysis, need not be included in AIS reports that follow an SHPD approved AISP. The decision to include this background information was made so that the City Center AIS report is a free-standing investigation that did not need to refer back to the City Center AISP. This decision did, however, increase the volume of information that needed to be included with the AIS report.

As this AIS report was compiled, it was understood that few readers would have the opportunity to read all the different volumes from cover to cover. Based on past experience, typically massive AIS reports are quickly subjected to “information triage” where the reader seeks out the specific information they need. It is with this information triage in mind that the different AIS volumes were put together. To the extent possible, volumes are designed to be largely self-contained. References between volumes are unavoidably common, but they were kept to the minimum possible by including redundant information. This redundancy is intentional and serves the reader that does not have the time for a cover to cover read of the multi-volume AIS report. For those readers with the time and patience for a cover to cover read of all volumes, your patience is appreciated with this redundancy.

The City Center AIS report is divided into ten (10) volumes. Volume I is the main document and contains the investigation's introduction, historic preservation regulatory context, and project description. It contains the methods and sampling strategy discussion, taken largely from the City Center AISP, but also updated. It also contains the archaeological cultural resource descriptions and significance discussion, the cultural consultation results, and the project effect and mitigation recommendations.

Volume II contains the previous archaeological summary, the traditional/historic background summary, and the settlement pattern analysis. Volume II is largely derived from the City Center AISP (Hammatt et al. 2011), although it has been substantially updated with more recent information. Information from Volume II is used and expanded upon for the individual geographic zone summaries presented in Volumes IVA through IVD (discussed below). Supplemental cultural, archaeological, and historical documentation for the Kaka‘ako area in particular is available from several literature review and cultural impact assessment documents, including: McElroy, Sims, and Desilets (2008); O'Hare, Volger and Hammatt (2011); Cruz, Giannasio, Hammatt (2012); O'Hare, Borthwick, and Hammatt (2012).

Volume III consists of land court documents from the *Māhele* (the mid-nineteenth century transition from a traditional Hawaiian to a Western land tenure system). Volume III largely serves to support the discussion in Volumes I, II, and IVA through IVD. The introduction to Volume III explains the context and the types of *Māhele* records presented, while the body of Volume III also contains copies of the actual land court records discussed in the AIS report.

Volumes IVA through IVD are the excavation results for the 250 test excavations (232 original, 9 abandoned, and 27 added test excavations) that were part of the City Center AIS investigation. The excavation results volumes are organized from west to east, and into the geographic zones discussed above:

Volume IVA Excavation Results (Geographic Zones 1–2)

West Kalihi Test Excavations 1–20

East Kalihi Test Excavations 21–47

Volume IVB Excavation Results (Geographic Zones 3–5)

West Kāpalama Test Excavations 48–53

East Kāpalama Test Excavations 54–85

Iwilei Test Excavations 86–95

Volume IVC Excavation Results (Geographic Zones 6–8)

Downtown Waterfront Test Excavations 96–115

West Kaka‘ako Test Excavations 116–161

Kewalo Test Excavations 162–178

Volume IVD Excavation Results (Geographic Zones 9–11)

East Kaka‘ako Test Excavations 179–197

Kālia Test Excavations 198–225

Kaka‘ako Makai Test Excavations 226–232

Each geographic zone begins with a geographic and cultural summary that provides the interpretative context for the individual test excavations and archaeological cultural resources within that geographic zone. These geographic zone summaries incorporate and expand upon the background information presented in Volume II.

Each individual test excavation summary in Volumes IVA to IVD begins with a header section that identifies the test excavation number and the following general information:

Ahupua‘a: (the traditional Hawaiian land division the excavation is in)
LCA: (the Land Commision Award [Māhele award] the excavation is in)
TMK #: (the Tax Map Key the excavation is in)
Elevation Above Sea Level: (elevation in meters, provided by project surveyors)
UTM: (NAD 83, Zone 4 north coordinates, excavation center point)
Max Length/Width/Depth: (the excavation's maximal dimensions in meters)
Orientation: (the excavation's long axis orientation to True North)
Targeted Project Component:(e.g., "station column," "utility relocation corridor," etc.)
USDA Soil Designation: (based on USDA soil survey data [Foote et al. 1972])

The body of the test excavation summary is divided into a number of subsections. "**Setting**" describes the location, built environment, and existing utilities immediately adjacent to the test excavation. Utility location information is based primarily on utility location CADD layers provided by PB (the general engineering consultant), but also on "one-call" utility location markings that were placed in the excavation vicinity by the various utility companies prior to excavation.

"**Summary of Background Research and Land Use**" provides a brief recap of what is known about past land use at each test excavation location. This information is based primarily on the background information presented in Volume II. This information (condensed into a GIS database that contained georeferenced historic maps and aerial photographs, previous archaeology projects, previously identified archaeological cultural resources, land commission award boundaries, and other environmental information) was reviewed and summarized by field crews before each excavation. This was done to provide a context for the interpretation of each test excavation. This information is included with each test excavation summary to provide this cultural/environmental context to the reader.

"**Documentation Limitations**" describes any unusual conditions or constraints to the documentation of the individual test excavations. Examples of such conditions or limitations include unsafe conditions that prohibit entry into the test excavation or that prohibit continued excavation, such as undermined sidewalls, or unstable sidewalls. If there were no unusual conditions or limitations, typically the depth of excavation and the depth of the water table are given.

"**Stratigraphic Summary**" provides a brief overview of the different stratigraphic layers observed in the excavation. This brief overview is supported by a detailed stratigraphic description based on USDA soil survey observations that is included as a table with each excavation summary.

The “**Artifact Discussion**” and “Feature Discussion” describe the artifacts and features that were documented in the excavation. Artifacts found in bulk sediment samples are described in the “Sample Results” section below. Only archaeological features are described—modern utility excavations less than 50 years old, for example, are not considered archaeological features and are not described in the feature discussion. Additionally, historic roadway features for in-use roadways (for example, Dillingham Boulevard), such as storm drains and other features associated with roadway use or construction, are considered parts of in-use architectural structures and not archaeological cultural resources. Accordingly, they are not described as archaeological features.

“**Terrestrial Faunal Remains Discussion**” focuses on summarizing the terrestrial faunal material collected from the test excavation during actual excavation. This most often consisted of the historic and modern terrestrial vertebrate material associated with historic and modern fill layers; however, this discussion also includes terrestrial faunal remains collected from natural and culturally-enriched buried A-horizons. This material was collected and identified to better characterize these deposits, but also to ensure that human remains were not present. Smaller terrestrial vertebrate remains collected as part of bulk sediment samples that were processed in the laboratory after excavation are described in the “Sample Results” sub-heading of each excavation summary as part of the discussion of bulk sediment sample results. Depending on the number of different species represented, a “terrestrial faunal identification results found during excavation” table is included with the excavation summary.

“**Sample Results**” briefly summarizes all other laboratory results, including Energy-Dispersive X-Ray Fluorescence (EDXRF), radiocarbon dating, pollen/micro charcoal particle analysis, the results of bulk sample analysis (can include additional artifact and faunal discussion), wood taxa identification, marine shell identification, and land snail identification. These results are more thoroughly discussed in Volume V: Laboratory Results.

“**GPR Discussion**” briefly describes the results of the comparison of the actual excavation results to the post-processed GPR survey results. This “ground trothing” is used as a means to evaluate the effectiveness of the GPR method in detecting stratigraphic boundaries and subsurface features. This discussion is amplified in Volumes VIA and VIB: GPR Results.

Each individual test excavation is summarized in the “**Summary**” subheading with a focus on what was learned from each test excavation. State Inventory of Historic Properties (SIHP) numbers are given for those test excavations that are part of archaeological cultural resources.

Volume V presents the laboratory results, including discussions of traditional Hawaiian artifacts, historic artifacts, processed bulk sediment samples, vertebrate material, invertebrate material, wood taxa identification, radiocarbon dating, EDXRF analysis, pollen/micro charcoal particle analysis, marine shell and land snail identification. Volume V provides detailed information to support Volumes I and IVA to IVD. Volume V also provides more detailed discussion of laboratory methods and procedures than what is included in this volume in Section 2.

Volumes VIA and VIB present the results of ground penetrating radar (GPR) survey and analysis. One of the goals of the City Center AIS was to assess the ability of GPR to determine stratigraphy and locate subsurface cultural deposits in the fully developed urban Honolulu

landscape. Accordingly, Volumes VIA and VIB present detailed comparisons of test excavation results with GPR survey results. Volumes VIA and VIB are organized by the 11 geographic zones discussed above.

1.4 Environmental Setting

The following environmental overview is augmented by environmental discussion in each of the geographic zone summaries in Volumes IVA, IVB, IVC, and IVD.

1.4.1 Natural Environment

The City Center AIS study area is situated along the low-lying coastal flats immediately inland of Kapālama Basin, Honolulu Harbor, and Kewalo Basin, generally within one km of the shoreline. The study area traverses Kalihi Stream, Kapālama Stream, and Nu‘uanu Stream. Elevations in the study area range from approximately one to seven meters (3 to 24 feet) above mean sea level. The study area receives an average of approximately 23 to 39 inches of annual rainfall (Giambelluca et al. 1986). As the City Center AIS study area traverses a predominantly urban landscape, vegetation in the study area and immediate vicinity consists primarily of introduced (non-indigenous) landscaping trees, shrubs, and ground covers. According to U.S. Department of Agriculture soil survey data (Figure 10), sediment types in the study area include exclusively: Fill Land (FL) and ‘Ewa Silty Clay Loam (EmA) (Foote et al. 1972).

Fill Land is described as follows:

> This land type occurs mostly near Pearl Harbor and in Honolulu, adjacent to the ocean. It consists of areas filled with material dredged from the ocean or hauled from nearby areas, garbage, and general material from other sources. Included in mapping were a few areas that have been excavated. This land type is used for urban development including airports, housing areas, and industrial facilities. (Foote et al. 1972:31)

‘Ewa Silty Clay Loam soils are described as follows:

> This soil occurs on alluvial fans and terraces…Permeability is moderate. Runoff is slow, and the erosion hazard is slight…The depth to coral limestone or gravelly alluvium ranges from 50 to more than 60 inches. In some areas cobble stones and stones occur on the surface and in the surface layer. This soil is used for sugarcane, truck crops and pasture. (Foote et al. 1972:29–3)

1.4.2 Built Environment

The study area traverses a predominantly urban environment, through the neighborhoods of Kalihi, Kapālama, Iwilei, Chinatown, Downtown Honolulu, and Kaka‘ako. The centerline of the project alignment is generally within the median or shoulder of various roads and highways, including: Kamehameha Highway, Dillingham Boulevard, Ka‘aahi Street, Nimitz Highway, Halekauwila Street, Queen Street, and Kona Street. Parcels bordering the roads and highways include a mix of commercial, industrial, and residential developments. Large developments in the vicinity of the study area include Honolulu Community College, the Aloha Tower Marketplace, and Ala Moana Center. Dillingham Boulevard and Nimitz/Ala Moana Boulevard,

and Halekauwila Street are major utility corridors with abundant subsurface and overhead utilities including: gas, water, electric, sewer, storm drain, telephone, and other communications.

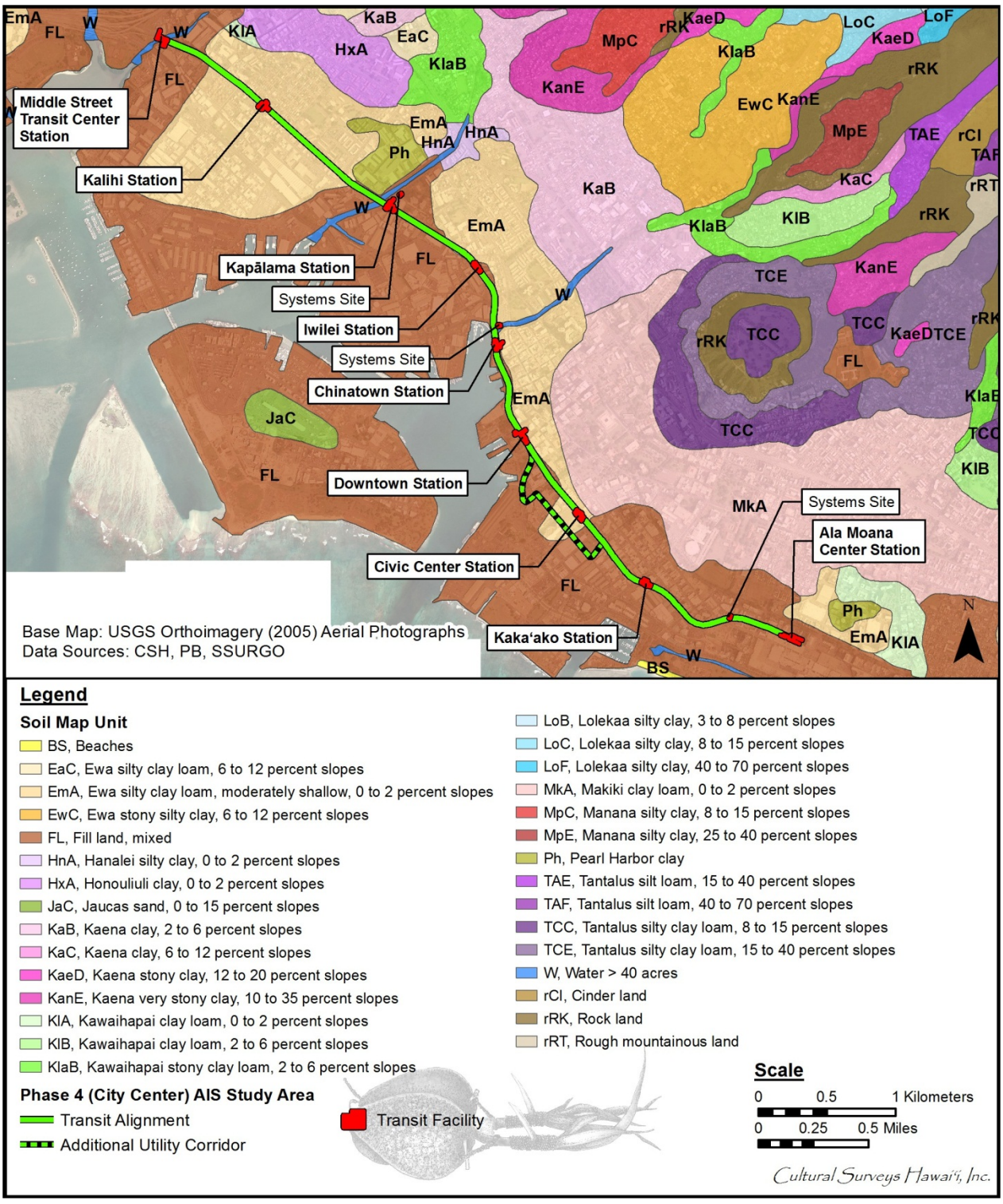

Figure 10. Aerial photograph (source: U.S.G.S. orthoimagery 2005) with overlay of the Soil Survey of Hawai‘i (Foote et al. 1972), showing USDA soil types in the vicinity of the City Center AIS study area